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% Micah Wilson
% Brake Model

clear all
close all
clc

% Wheel
mu_tire = 1.2;
rear_bias = 0.4;
front_bias = 0.6;
W = 1000; %lb
N_f = W*front_bias/2; %lb
N_r = W*rear_bias/2; %lb
F_wheel_f_lock = N_f*mu_tire %lb
F_wheel_r_lock = N_r*mu_tire %lb

% Brake
d_disc = 9; %in
d_wheel = 20; %in
mu_pad = 0.3;
F_B_f = (d_wheel/d_disc)*F_wheel_f_lock; %lb
F_B_r = (d_wheel/d_disc)*F_wheel_r_lock; %lb
F_N_pad_f = F_B_f/(2*mu_pad) %lb
F_N_pad_r = F_B_r/(2*mu_pad) %lb

% Caliper
d_brake_cyl = 0.5:0.01:2; %in
A_brake_cyl = pi*d_brake_cyl.^2/4; %in^2
P_f = F_N_pad_f./A_brake_cyl; %psi
P_r = F_N_pad_r./A_brake_cyl; %psi

% Master Cylinder
d_mc = 0.5:0.1:2; %in
d_mc = 0.5; %in APPROXIMATE ID OF BREMBO REAR MC
A_mc = pi*d_mc.^2/4; %in^2
F_mc_f = P_f.*A_mc; %lb
F_mc_r = P_r.*A_mc; %lb

% Pedal
F_p = (F_mc_f+F_mc_r)'; %lb

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